

## WHAT IS CLAIMED IS:

1. A liquid sprayer comprising:

a liquid holder exposing a liquid surface of conductive liquid sprayed on an

5 object; and

a field applier forming an equipotential surface convexed with respect to the liquid surface of a conductive liquid sprayed on an object.

2. The liquid sprayer according to claim 1, comprising:

a conductive nozzle plate, supplied with a potential different from that for said

object, having:

a first opening exposing said liquid surface, and

a second opening wider than said first opening and arranged closer to said object than said first opening.

3. The liquid sprayer according to claim 2, further comprising:

a concave portion provided between said first opening and said second opening and concaved with respect to said object.

4. The liquid sprayer according to claim 3, wherein

the angle in said first opening of said nozzle plate is in excess of  $270^\circ$ .

5. The liquid sprayer according to claim 2, wherein

said first and second openings are provided in plural respectively.

6. The liquid sprayer according to claim 5, further comprising:  
a vibration extitor provided in correspondence to each of said first openings and  
vibrating said liquid for spraying said liquid.

5 7. The liquid sprayer according to claim 2, further comprising:  
a step provided between said first opening and said second opening.

10 8. The liquid sprayer according to claim 7, wherein  
said first and second openings are provided in plural respectively.

9. The liquid sprayer according to claim 8, wherein  
the shapes of said first and second openings are not similar to each other.

15 10. The liquid sprayer according to claim 1, comprising:  
a conductive nozzle plate having a first opening exposing said liquid surface,  
and  
a conductive auxiliary plate arranged closer to said object than said nozzle plate  
for exposing said first opening to said object.

20 11. The liquid sprayer according to claim 10, wherein  
said nozzle plate and said auxiliary plate are supplied with the same potential.

25 12. A liquid sprayer comprising:  
a nozzle plate having an opening exposing a liquid surface of a liquid sprayed  
on an object; and

a discharger, supplying charges to said liquid at least on said liquid surface and a surface of said nozzle plate closer to said liquid surface, relatively movable with respect to said nozzle plate.

5           13. The liquid sprayer according to claim 12, wherein  
said discharger is a corona discharger.

10           14. The liquid sprayer according to claim 12, forming an equipotential  
surface convexed with respect to said liquid surface.

15           15. The liquid sprayer according to claim 14, wherein  
said nozzle plate has:  
a first opening exposing said liquid surface, and  
a second opening wider than said first opening and arranged closer to said  
object than said first opening, and  
said discharger supplies said charges to said nozzle plate from the side of said  
second opening.

20           16. The liquid sprayer according to claim 15, further comprising:  
a concave portion provided between said first opening and said second opening  
and concaved with respect to said object.

25           17. The liquid sprayer according to claim 1, wherein  
said liquid is supplied with ultrasonic vibration and sprayed from said liquid  
surface.

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18. The liquid sprayer according to claim 17, further comprising:  
drive means generating said ultrasonic vibration, and  
a reflecting wall reflecting said ultrasonic vibration propagating through said  
5 liquid and converging said ultrasonic vibration on said liquid surface.

19. The liquid sprayer according to claim 12, wherein  
said liquid is supplied with ultrasonic vibration and sprayed from said liquid  
surface.

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20. The liquid sprayer according to claim 19, further comprising:  
drive means generating said ultrasonic vibration, and  
a reflecting wall reflecting said ultrasonic vibration propagating through said  
liquid and converging said ultrasonic vibration on said liquid surface.

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